Environmental Assessment

For

Non-native Invasive Plant Species Project

Responsible Agency:
U.S. Forest Service
Ouachita National Forest
Caddo/Womble Ranger District

Responsible Official:
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This project is subject to subparts A and B of *36 CFR Part 218 Project-Level Pre-decisional Administrative Review Process* (objection process); it is not authorized under the Healthy Forest Restoration Act (HFRA).

May 2020

TABLE OF CONTENTS

LISTING OF FIGURES & TABLES

Chapter 1
Purpose of and Need for the Proposed Action

Introduction

The Southern Region of the U.S. Forest Service established a regional strategy for the prevention, control, and eradication of non-native invasive plant species (NNIPS) (US Forest Service, 2005c).

Invasive species threaten the sustainability of our forest ecosystems, locally, regionally, nationally, and globally. Forests within the thirteen states of the Southern Region are rich in biological diversity and provide vital goods and services. The current infestations and growing threat of non-native invasive species can displace diversity and habitats, disrupt vital ecosystem functions, and degrade productivity and recreational benefits. Non-native invasive plants have increased in their range and severity. A well-conceived and organized program of invasive species prevention and management is warranted and overdue.

The Non-native Invasive Plant Species Project on the Caddo-Womble Ranger District (C/W), Ouachita National Forest is part of an ongoing national effort to combat existing NNIPS populations and curtail entry of new NNIPS.

Proposed Action

The C/W is proposing to control known NNIPS infestations and future occurrences using a combination of manual, mechanical, cultural, and chemical treatment methods.

Infestations would be scheduled for treatment utilizing the Ouachita National Forest's Prioritization Matrix for Selecting NNIS Projects (US Forest Service, 2009). Although known infestations would be treated initially, treatment of new locations and/or newly recognized species is also proposed. See Chapter 2 for a detailed description of the proposed action.

This proposal would be implemented throughout the C/W, located in central Arkansas (Garland, Montgomery, Pike, Polk, Howard and Hot Spring Counties). As of May 2019, the C/W was comprised of approximately 310,000 National Forest System (NFS) acres.]

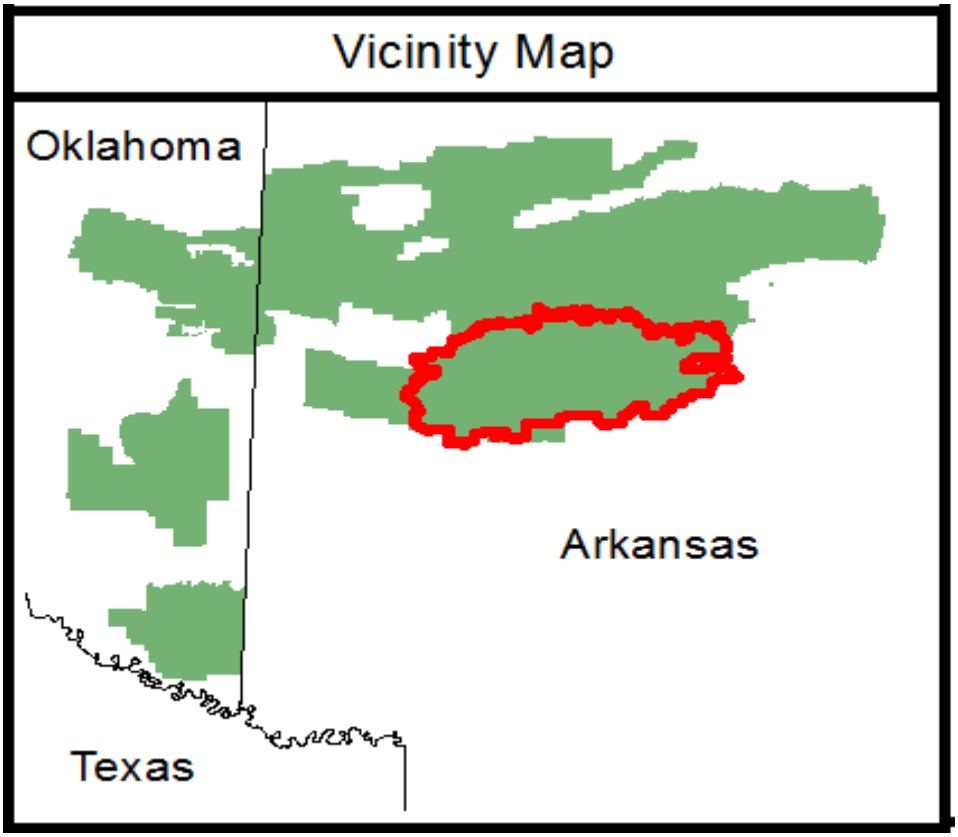

Figure 1. C/W vicinity map.

Purpose of and Need for the Action

Contrasts between current and desired conditions illustrate the need for proposed management activities. The Revised Land and Resource Management Plan (Revised Forest Plan) for the Ouachita National Forest describes ***Desired Conditions*** for Terrestrial, Riparian, and Aquatic Ecosystems as follows:

> Species composition for all native plant communities falls within the natural range of variation described in 2003 by NatureServe (a non-profit conservation organization that provides the scientific information and tools needed to help guide effective conservation action) for the Ouachita Mountain and West Gulf Coast Plain communities that occur within the Forest. Where native species have been displaced by non-native or off-site species, systems will be restored over time to native species composition. The mix of ecological conditions, including a range of structural conditions in the major community types, will be adequate to support viable populations of all native plant and animal species. (Revised Forest Plan, p.6)

Current Conditions:

NNIPS infestations have been documented across the unit, commonly occurring in areas of soil disturbance (timber sale areas and wildlife openings) and migration pathways (trails, riparian corridors, roadsides, and utility corridors). Some NNIP species, such as Japanese honeysuckle and privet, are found

throughout the general forest area. **Table 1.1** displays 50 species which occur or are likely to occur on the Forest and includes a ranking that reflects the invasiveness of each species. The Forest will add species to the list if they are later found to occur on the forest.

Priority Ranking for NNIPS on the Ouachita National Forest (Table 1.1)

Scientific Name	Common Name(s)	Rank
Ailanthus altisimma	Tree of heaven	High
Albizia julibrissin	Mimosa, Silktree	Moderate
**Allium vineale*	Wild garlic	Low
Alliaria petiolata	Garlic mustard	Low
Arundo donax	Giant Reed	Moderate
Arthraxon hispidus	Carpgrass	Moderate
**Bromus spp. (secalinus, racemossus, tectorum)*	Cheatgrass, bromegrass, chess	High
Calystegia sepium	Hedge false bindweed	Low
Carduus nutans	Nodding thistle, musk thistle	Moderate
Celastrus orbiculatus	Oriental bittersweet	Low
Centaurea beibersteinii (incl. C. maculosa and C. stoebe)	Spotted knapweed, Russian knapweed	Low
Cirsium vulgare	Bull thistle	Moderate
**Convolvulus arvenis*	Field bindweed	High
Coronilla varia	Crown vetch	High
**Cuscuta spp*	Dodder	Moderate
**Cynodon dactylon*	Bermudagrass	Moderate
**Cyperus rotundus*	*Nut grass*	High
Dioscorea batatas (=D. oppositifolia)	Chinese yam	Low
Eichhornia crassipes	Common water hyacinth	Low
Elaeagnus spp. (E. umbellata, E. pungens, E. angustifolia)	Russian olive, thorny olive, autumn olive	Low
Eragrostis curvula	Weeping lovegrass	High
Euonymus fortunei	Winter creeper Euonymus	High
Euonymus alatus	Winged Burning Bush	High
Festuca elatior	Tall Fescue	
Hedera helix	English ivy	High
Hydrilla verticillata	Water thyme	Low
Lespedeza cuneata	Sericea lespedeza	Moderate
Lespedeza bicolor	Shrubby Lespedeza	Moderate
Ligustrum sinense (& L. vulgare)	Privet	Low
Lolium arundinaceum (a.k.a Festuca arundinacea)	Tall fescue	Moderate
**Lolium temulentum*	Darnel	High
Lonicera japonica	Japanese honeysuckle	High
Lonicera maackii	Bush honeysuckle, shrub honeysuckle	Moderate
Lythrum salicaria	Purple loosestrife	Moderate
Kummerowia striata (=Lespedeza striata)	Japanese clover	High
Melia azedarach	Chinaberry	High
Microstegium vimineum	Japanese stiltgrass, Nepalese browntop	Moderate
Myriophyllum spicatum	Eurasian watermilfoil	Low

Scientific Name	Common Name(s)	Rank
Nandina domestica	Sacred Bamboo, Nandina	High
Nymphoides peltata	Yellow floating heart	Moderate
Paulownia tomentosa	Princesstree, Paulownia	Moderate
Phyllostachys spp. and *Bambusa* spp.	Bamboos	Low
Poncirus trifoliata	Trifoliate orange	Moderate
Pueraria montana	Kudzu	Low
Rosa multiflora	Multiflora rose	Moderate
Rubus phoenicolasius	wineberry	High
**Sorghum halepense*	Johnson grass	Moderate
Verbena brasiliensis	Brazilian vervain	High
Vinca major (& V. minor)	Periwinkle	High
Wisteria sinense (& possibly W. floribunda)	Chinese wisteria	High

*Noxious Weeds Listed for Arkansas

NNIPS treatments are currently incorporated into vegetation management projects at the watershed level that include many different management activities (i.e. timber harvest, wildlife habitat improvements, and trail construction). There is no tool in place to quickly treat new infestations outside of these approved projects.

Figure 2. Sericea lespedeza on FS Road.

The purpose of this project is to achieve the desired conditions for healthy ecosystems by implementing the following Revised Forest Plan ***Priorities and Objectives*** and the ***Goal***, ***Vision, and Program Elements*** of the Southern Region's NNIS Program:

Take steps to ***improve forest health by reducing the likelihood of*** insect

infestations, disease outbreaks, and ***establishment of non-native, invasive species on National Forest System lands***. (Revised Forest Plan, p. 58)

Use an integrated pest management approach to prevent or reduce damage to forest resources from pest organisms, including non-native, invasive species. (Revised Forest Plan, p. 58)

Treat at least 300 acres per year for non-native, invasive species. (Revised Forest Plan, p. 59)

Conduct inventories to determine the presence and extent of non-native invasive species in wildernesses . . . develop and implement appropriate monitoring and treatment programs. (Revised Forest Plan, p. 66)

Reduce, minimize, or eliminate the potential for introduction, establishment, spread, and impact of non-native invasive species across all landscapes . . . protect native ecosystems and biodiversity, as well as begin restoration of desired ecological functions and components after NNIS removal. (Southern Regional Framework for NNIS, p. 1)

Early Detection Rapid Response (EDDR) is a critical component of a NNIPS management program. When new NNIS infestations are detected, a quick and coordinated containment and eradication response can reduce environmental and economic impacts. This results in lower cost and less resource damage than implementing a long-term control program after the species is established. (Southern Regional Framework for NNIS, p. 7) The Southern Region's priority NNIPS list would be used for EDDR (US Forest Service, 2013).

Scope of This Environmental Analysis

Relevant Planning Documents

The following documents directly influence the scope of this environmental analysis.

- Revised Land and Resource Management Plan for the Ouachita National Forest (Revised Forest Plan, US Forest Service, 2005a)
- Final Environmental Impact Statement, Revised Land and Resource Management Plan (US Forest Service, 2005b)
- Southern Regional Framework for Non-Native Invasive Species (US Forest Service, 2005c)
- A Management Guide for Invasive Plants in Southern Forests (US Forest Service, 2010)

The Revised Forest Plan guides all natural resource management activities for the Ouachita National Forest. The forest management direction, communicated in terms of Desired Conditions (pp. 6-26); Strategies (pp. 27-72); and Design Criteria (pp. 73-123) that apply to the forest lands identified in this proposal are incorporated by reference.

Reference for Forest Plan Design Criteria by Management Area (Table 1.2)

Management Area (MA)	Forest Plan Reference
2. Special Interest Areas	Part 3, p. 101-102
3. Developed Recreation Areas	Part 3, p. 102
4. Research Natural Areas	Part 3, p. 102
5. Experimental Forests	Part 3, p. 102
6. Rare Upland Communities	Part 3, p. 102
7. Ouachita Seed Orchard	Part 3, p. 103
8. Administrative Sites/Special Uses	Part 3, p. 103
9. Water and Riparian Communities	Part 3, pp. 103-108
14. Ouachita Mountains-Habitat Diversity Emphasis	Part 3, p. 108
15. West Gulf Coastal Plain-Habitat Diversity Emphasis	Part 3, p. 109
16. Lands Surrounding Lake Ouachita and Broken Bow Lake	Part 3, p. 109-111
17. Semi-Primitive Areas	Part 3, p. 111-112
19. Winding Stair Mountain National Recreation Area and Associated Non-Wilderness Designations	Part 3, p. 112-115
20. Wild and Scenic River Corridors and Eligible Wild and Scenic River Corridors	Part 3, pp. 115-118
21. Old Growth Restoration (Pine-Grass Emphasis)	Part 3, pp. 118-119
22. Renewal of the Shortleaf Pine-Bluestem Grass Ecosystem and Red-cockaded Woodpecker (RCW) Habitat	Part 3, p. 120-122

No NNIPS treatments are proposed in wilderness (MA 1) under this project. Future NNIPS treatments proposed as part of the 10 Year Wilderness Stewardship Challenge would require development of a Wilderness NNIPS Management Plan, environmental analysis, and Regional Forester approval.

NNIPS treatments in Research Natural Areas (MA 4) would be coordinated with the Southern Research Station. No herbicide treatments are proposed in MA 4 under this project. Future NNIPS herbicide treatments would require coordination with the Southern Research Station, environmental analysis, and Regional Forester approval.

History of the Planning and Scoping Process

A project announcement letter was mailed to the district's public mailing list on January 31, 2020. One comment was received, but no issues were created in response to this solicitation.

Issues

Issues (cause-effect relationships) serve to highlight effects or unintended consequences that may occur from the proposed action, providing opportunities during the analysis to explore alternative ways to meet the purpose and need for the proposal while reducing adverse effects. Issues also provide a tool for comparing trade-offs for the decision maker and public to understand.

Based on a review of internal comments (no external comments were received), the Interdisciplinary (ID) Team identified the following issues to be analyzed in depth:

- **Issue 1:** NNIP species are known to have been used for landscaping of farm sites and homesteads. These remnant plant species may be the only visible indicators of the presence of an historic home site or farmstead. They represent a remnant historic landscape, and their eradication, regardless of means used, would represent an adverse effect upon the cultural integrity of an extant but undocumented historic property.

- **Issue 2:** The Revised Forest Plan states that herbicides will be used only where necessary to achieve the desired condition in the treatment area (HU001, p. 87). Forest policy requires analysis of alternatives to herbicide use; the Proposed Action includes alternative manual, mechanical and cultural methods. The environmental consequences of herbicide use are disclosed throughout Chapter 3.

Decisions to Be Made

The District Ranger must decide which alternative to select. The District Ranger must also determine if the selected alternative would or would not be a major Federal action, significantly affecting the quality of the human environment.

Chapter 2
Alternatives Including the Proposed Action

Alternatives

Alternative A

Alternative A (No Action) The Proposed Action would not be implemented. NNIPS treatments included in approved watershed level projects would continue to be implemented. This alternative represents the current condition and serves as a baseline against which the effects of each action alternative can be compared.

Alternative B

Alternative B (Proposed Action) as introduced in Chapter 1. Known NNIPS (see **Table 1.1**) infestations and future occurrences would be controlled using a combination of manual, mechanical, cultural, and chemical treatment methods. Based on acres of soil disturbance from forest management activities (i.e. timber sales) and miles of migration pathways (i.e. roadsides), NNIPS control activities could be expected to take place on an average of 400-500 acres per year.

Methods

Manual methods include hand pulling as well as use of a wide array of tools for cutting, chopping, wrenching, and girdling invasive plants. Manual methods are mostly used on woody invasive plants when they are small.

> **Hand pulling** can be readily performed on seedlings of invasive woody plants (and some large herbaceous invasives) when soils are moist or loose. If the roots are completely extracted, then eradication is possible.
>
> **Girdling** tools can control some invasive tree and shrub species, although this treatment is marginally effective. Both mechanical and gas-powered girdling tools are available specifically for girdling trees. Other girdling tools include chainsaws, axes, and levered chains.

Figure 3. Hand pulling; tree girdling.

Mechanical methods use machines to clear large or dense infestations. Skidders, mulchers, tractors and bulldozers having special attachments would be used to reduce invasive woody plants. Brush rakes and root rakes are blades with extending lower teeth that dislodge surface roots and stumps of smaller trees.


Figure 4. Brush rake; bulldozer clearing Chinese privet.

Cultural methods include prescribed burning across the forest floor, spot-burning individual or small groups of plants, and physical barriers (mulch, weed cloths, plastic sheeting). The most effective time for weakening woody invasive plants is burning in the late spring after plants have initiated growth using root reserves.


Figure 5. Prescribed burning; spot burning.

Chemical methods include herbicide applications to the foliage and/or stems of NNIPS.

Application methods:

Directed foliar sprays are herbicide-water-adjuvant solutions aimed at target plant foliage to wet all leaves, usually applied with backpack sprayers. With this method, herbicide mixtures are applied to the foliage and especially the growing tips of woody plants less than six feet in height, or to completely cover herbaceous plants. Foliar sprays can be applied whenever leaves are present but,

for woody plant control, are usually most effective during the spring and summer months when vegetation is green and growing.

Basal sprays are herbicide-oil-penetrant mixtures sprayed on the lower portion of woody shrub, vine, and tree stems. The sprays are usually applied with a backpack sprayer or wick applicator. The most effective time period in most of the South for a basal spray is June through September, while winter treatments are easier when leaves do not block access and spray.

Figure 6. Basal spray application.

Stem injection (including hack-and-squirt) involves herbicide concentrate or herbicide water mixtures applied into downward incision cuts spaced around woody stems. Cuts are made by an ax, hatchet, machete, brush ax, cane knife, or a variety of cutting tools. Tree injection is a selective method of controlling larger trees, shrubs, and vines (greater than 2 inches in d.b.h.) with minimum damage to surrounding plants. The stems may also be completely girdled and the herbicide mixtures applied to the area of removed bark.

Figure 7. Hack and squirt method.

Cut-treat involves applying herbicide concentrates, herbicide-water or herbicide-penetrant mixtures to the outer circumference of freshly cut stumps or the entire top surface of cut stems. Applications are made with a spray bottle, backpack sprayer, wick, or paint brush. Freshly cut stems and stumps of trees, woody vines, shrubs, canes, and bamboo stems can be treated with herbicide mixtures to prevent resprouting and to kill roots. Cutting is usually by chainsaw. The most effective time for the cut-treat method has not been determined for all invasive species, while summer and fall have shown to provide good control.

Figure 8. Cut-treat method.

Herbicides:

The following chemicals could be used for NNIPS treatment under this project. These herbicides have Forest Service approved risk assessments (see http://www.fs.fed.us/foresthealth/pesticide/risk.shtml). Application rates would be informed by "A Management Guide for Invasive Plants in Southern Forests" (US Forest Service, 2010).

- **Aminopyralid** is a selective herbicide that has been registered provisionally as a *reduced risk* pesticide as an alternative to picloram, 2,4-D, dicamba, and metsulfuron methyl for the control of broadleaf weeds.
- **2,4-D**, the common name for 2,4-dichlorophenoxyacetic acid, is a selective systemic herbicide used to control broadleaf weeds.
- **Chorsulfuron** is recommended for pre-emergent and early post-emergent control of many annual, biennial, and perennial broadleaf weeds.
- **Clopyralid** is a selective herbicide used primarily in the control of broadleaf weeds. The Forest Service uses only a single commercial formulation of clopyralid, Transline.
- **Dicamba** is recommended for the control of a variety of broadleaf weeds and woody vegetation. Two commercial formulations of dicamba may be used in Forest Service programs, Vanquish and Banvel. Banvel is the dimethylamine salt of dicamba and Vanquish is the diglycolamine (DGA) salt of dicamba.

- **Fluroxypyr** is a selective post-emergent systemic herbicide registered for the control of broadleaf weeds in rangeland, non-crop areas, and grazed areas as well as for the control of woody brush.

- **Glyphosate** is a post emergence, systemic herbicide, generally non-selective, and provides broad-spectrum control of many annual weeds, perennial weeds, woody brush and trees.

- **Imazapic** is used in the control of grasses, broadleaves, and vines. The Forest Service will typically use imazapic in noxious weed control and rights-of-way management.

- **Imazapyr** is used in the control a variety of grasses, broadleaf weeds, vines, and brush species. While imazapyr formulations can be used in pre-emergence applications, the most common and effective applications are post-emergent when the vegetation to be controlled is growing vigorously.

- **Metsulfuron Methyl** is a selective pre-emergence and post-emergence sulfonyl urea herbicide used primarily to control many annual and perennial weeds and woody plants.

- **Picloram** is used in the control of a number of broadleaf weeds and undesirable brush and is used in Forest Service programs almost exclusively for the control of noxious weeds. Picloram would only be used to control kudzu.

- **Sulfometuron Methyl** is a non-selective, sulfonyl urea herbicide used in the control the growth of broadleaf weeds and grasses. It is used in Forest Service programs primarily for the control of noxious weeds.

- **Triclopyr** is a selective herbicide that controls many species of herbaceous and woody broadleaf weeds, but has little to no effect on grasses. Two forms of triclopyr are used commercially as herbicides: the triethylamine salt and the butoxyethyl ester.

Should new chemicals become available for use in this project, they may be used if a Forest Service approved risk assessment shows their use to meet or exceed the protection of the environment insured by the standards published in the Revised Forest Plan, and if the risk assessment shows their environmental impact is within the scope and range of effects considered in this analysis. This also applies to existing/known chemicals without Forest Service approved risk assessments; should risk assessments for these known chemicals become available in the future, these chemicals may be used if they meet the criteria described above.

Rehabilitation

Rehabilitating native communities can reduce the risk of future encroachment in areas where control measures have reduced or eliminated invasive species. Areas where NNIPS have been removed would be revegetated with native species. When possible, native seed sources developed on the Forest would be utilized.

Known NNIPS Infestations Proposed for Treatment

Documented NNIPS infestations proposed for treatment are listed in **Table 2.1** and displayed in **Figures 9** in red.

NNIPS Infestations Proposed for Treatment (Table 2.1)

Site	Location	Species	Acres	Treatment Method
Compartment 24 Stand 1	Within stand	Kudzu	2.2	Foliar spray July-September
Birding trail and wildlife openings	Mauldin Fields	Sericea lespedeza, wine raspberry,	68	Prescribed burn early spring Foliar spray July-September Brushhog prior to spray
Wildlife openings	Warren Fields	Autumn olive, sericea lespedeza	53	Foliar and spot spray July - September
Wildlife openings	Kruger Fields	Tall fescue, sericea lespedeza, autumn olive, privet	16	Foliar spray July - September Mow 1-3 months prior to spray
FS Road 913A	Roadsides	Sericea lespedeza	1.9	Foliar spray July – September
Freedom Road (MG197)	Roadsides	Sericea lespedeza	6-15	Foliar spray July - September
Compartment 26 stand 8	Within stand	Shrubby lespedeza	175	Foliar spray July - September
FS Road C22C and within stand 3	Roadsides and Compartment 22 Stand 3	Shrubby lespedeza	4.0 and 60	Foliar spray July - September
FS Road W29A	Roadsides	Sericea lespedeza	2.6	Foliar spray July - September
FS Road 73	Roadsides	Sericea lespedeza	13	Foliar spray July - September
FS Road C16D	Roadsides	Bicolor lespedeza	2.85 mi.	Foliar spray July - September
FS Road 512	Roadsides	Bicolor lespedeza	9 mi	Foliar spray July - September
FS Road C26C	Roadsides	Honeysuckle and privet	.78 mi.	Foliar spray July - September
FS Road C23A	Roadsides	Autumn olive	.2 mi.	Foliar spray July - September
FS Road W60	Roadsides	Sericea lespedeza	12	Foliar spray July - September
FS Road 151	Roadsides	Privet	.5 mi.	Foliar spray July – September

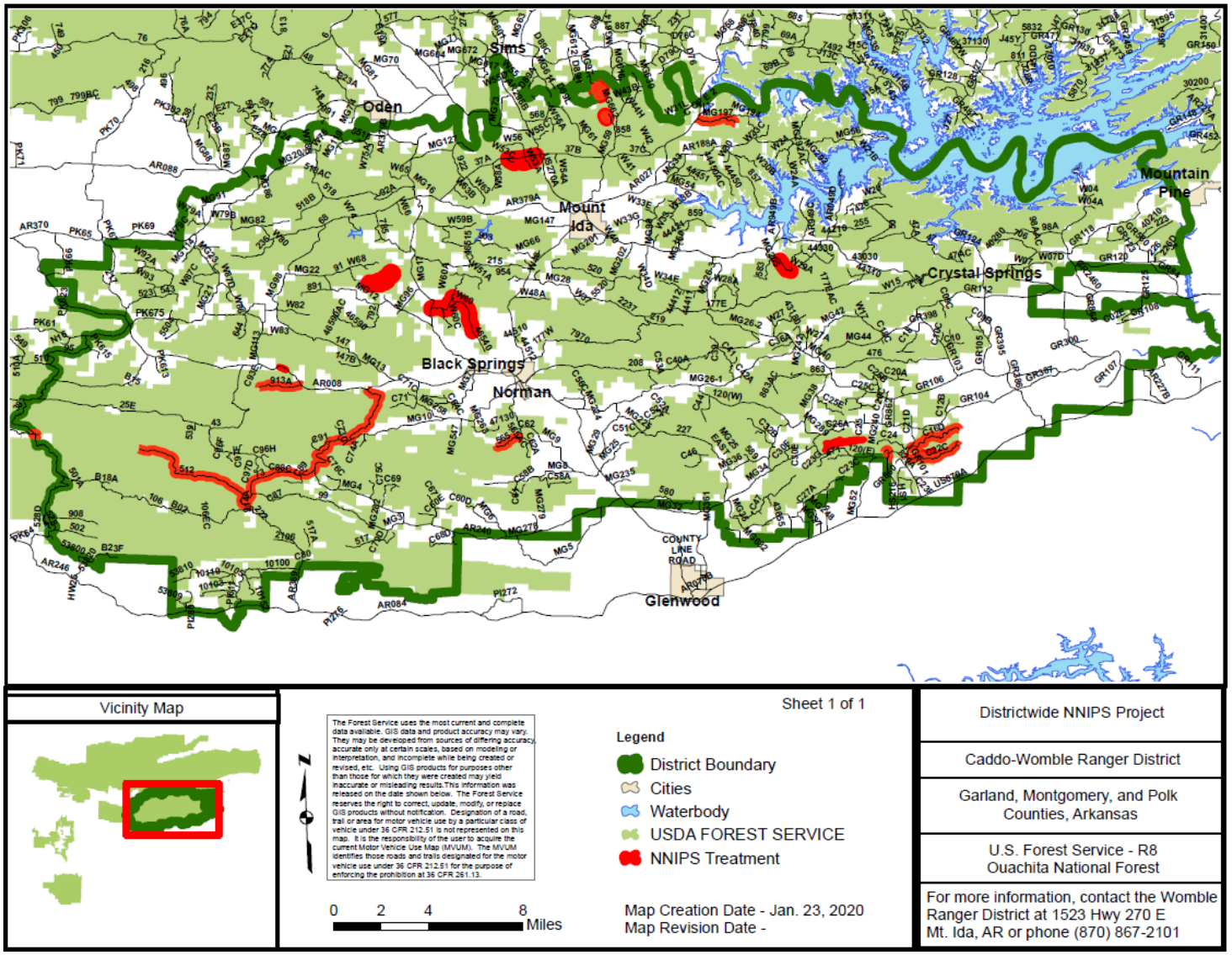

Figure 9. Proposed treatment locations of known infestations on district.

Prior to conducting NNIPS treatments on National Forest lands, site-specific documentation for each action would be prepared and retained by C/W (see Appendix A for NNIPS Treatment Form).

Project Design Criteria

Design criteria provide the technical and scientific specifications that must be met to complete acceptable projects. Design criteria are developed to ensure compliance with applicable laws, regulations, Executive Orders, and policies; and to resolve management issues and concerns.

All applicable design criteria would be carried out as detailed in the Revised Forest Plan. Specific to herbicide application, the following Forest-wide and Management Area design criteria are noted here:

- Herbicides will not be applied to Ozark chinquapin, and stems of this species will be individually flagged or otherwise marked in the field by qualified personnel prior to herbicide application within the stand. Use of soil active, mobile herbicides should not be applied where they might move to the root system of this species[1]. (TE008, p. 77)

- Herbicides will be applied at the lowest rate effective in meeting project objectives and according to guidelines for protecting human and wildlife health. Application rate and work time must not exceed levels that pose an unacceptable level of risk to human or wildlife health. Site specific risk assessments are required prior to herbicide application and must be calculated using the procedure developed by Syracuse Environmental Research Associates (SERA). Should contractor or methodology change, a standard at least equally restrictive will be imposed to define acceptable risk. (HU002, p. 87)

- With the exception of permittee treatment of right-of-way corridors that are continuous into or out of private land and through Forest Service managed areas, no herbicide is broadcast within 100 feet of private land or 300 feet of private residence, unless the landowner agrees to closer treatment. (HU009, p. 88)

- The use of herbicides is prohibited in the immediate vicinity[2] of Proposed, Endangered, or Threatened plants. In areas occupied by Sensitive plant species, use herbicides only where site-specific environmental analysis and biological evaluation conclude that there would be no negative effects or that the potential benefits of herbicide use significantly outweigh the potential negative effects. (HU010, p. 88)

[1] 30-feet per Forest Botanist
[2] 30-feet per Forest Botanist

- Within a 300-foot buffer from any source waters (public water supply), do not apply herbicide treatments unless a site-specific analysis supports use within the designated buffer to prevent more serious environmental damage than is predicted if pesticides are used. (HU011, p. 88)

- No herbicide mixing, loading, or cleaning areas will occur within a 300-foot buffer of private land, open water, source waters (public water supply), wells, or other sensitive areas. (HU012, p. 88)

- Application equipment, empty herbicide containers, clothes worn during treatment, and skin will not be cleaned in open water or wells. Mixing and cleaning water must come from a public water supply and be transported in separately labeled containers. (HU013, p. 88)

- Weather will be monitored, and the project will be suspended if temperature, humidity, or wind exceeds a threshold for herbicide use (see Table 3.8, p. 89 Revised Forest Plan) (HU015, p. 88)

- Picloram may only be used to control kudzu. (HU016, p. 89)

- A certified pesticide applicator will administer all pesticide application contracts and will supervise any Forest Service personnel involved with the application of pesticides on the Forest. (HU018, p. 89)

- Pesticide use within MA 9 will be approved on a case-by-case basis by the Forest Supervisor, following site-specific analysis and a monitoring plan. Terrestrial vegetation control using herbicides within MA 9 may only be conducted on dams or for control of invasive and/or exotic species and will only be with an appropriately labeled formulation for both aquatic and terrestrial site use. Aquatic application of herbicide for control of invasive or nuisance aquatic vegetation/algae may occur, providing biological controls have failed, are not available, and/or other means of control are not suitable or practicable. (9.13, p. 106)

Specific to prescribed burning activities, the following apply:

- During prescribed burning activities, sign travel ways notifying the public there may be smoke along the road.

- Position flaggers along the travel ways during active flaming.

- Inform the public of potential burn days, times, information contacts, and suggested alternatives for those concerned with smoke.

- Notify local, county and state law enforcement that burning will take place.

Monitoring

The Revised Forest Plan lists monitoring activities for the Ouachita National Forest. The Forest's monitoring program is designed to evaluate the environmental effects of actions similar to those proposed in this project, and also serves to assess the effectiveness of treatments.

In order to ensure that the appropriate design criteria protecting soil stability, water quality, and other resources are followed, trained contract administrators and inspectors will be on-site during the implementation phase of the project.

For those activities that include the use of herbicides, surveillance monitoring to ensure that herbicide label instructions are being followed will be conducted as part of the contract administration.

Condition of target vegetation will be observed to ensure it was controlled as a result of the treatment. This information will indicate whether or not additional treatments are necessary.

Non-target vegetation will be assessed to determine if there are any adverse impacts as a result of the treatment.

Treated areas will be assessed to determine restoration needs.

Within 9 months after herbicide application, a post-treatment evaluation report will be completed (FSH 2109.14, 72). The report shall contain the following:

1. Name and location of the target pest.
2. Treatment objectives.
3. Date of treatment.
4. Pesticide application:
    a. Equipment malfunctions.
    b. Pesticide formulation problems.
    c. Overlaps and/or skips noted.
    d. Weather conditions.
    e. Application timing.
    f. Treatment costs.
5. Treatment success in terms of:
    a. Pest population reduction.
    b. Growth reduction (as a result of herbicide use).
    c. Acreage covered.
6. Monitoring results.
7. Recommendations for followup and/or future treatments.

Chapter 3
Environmental Consequences

Cultural & Historical Resources

No Action

The Proposed Action would not be implemented. NNIPS treatments included in approved watershed level projects would continue to be implemented. Potential effects on cultural and historical resources (described below) would be confined within these project areas.

Proposed Action

An effect to a cultural resource is the "…alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register." (36 CFR 800.16(i)) Any activity that has potential to disturb the ground has potential to directly affect archeological sites, as does the use of fire as a management tool. Proposed activities that do not have potential to affect cultural resources, and therefore, are not considered undertakings for purposes of this project include: non-native invasive plant species control using non-ground disturbing methods.

The treatments proposed for the known NNIPS infestations listed in **Table 2.1** would not affect historic or cultural resources. These treatments include herbicide application along roadsides, within stands, birding trails and existing wildlife openings; prescribe burn and foliar spray 68 acres of existing wildlife openings; mow and foliar spray 16 acres of existing wildlife openings.

Future infestations may be treated using mechanical methods to clear large or dense infestations. Skidders, mulchers, tractors and bulldozers having special attachments may be used to reduce invasive woody plants. Brush rakes and root rakes, blades with extending lower teeth, dislodge surface roots and stumps of smaller trees; they would also dislodge surface artifacts if sites are not avoided. Fireline construction would result in ground disturbance and historic properties with combustible elements would be at risk for damage from prescribed burning. Additional ground disturbance may result from native species restoration or revegetation activities on treated areas.

NNIP species are known to have been used for landscaping of farm sites and homesteads. These remnant plant species may be the only visible indicators of the presence of an historic home site or farmstead. They represent a remnant historic landscape, and their eradication, regardless of means used, would represent an adverse effect on the cultural integrity of an extant but undocumented historic property. All treatment methods would decrease vegetation; surface artifacts or features may be exposed, disturbed or removed due to increased access and visibility.

Prior to conducting future NNIPS treatments, site-specific documentation for each action would be prepared (see Appendix A for NNIPS Treatment Form). Areas would be surveyed and regulatory and tribal consultation completed prior to implementation.

Public Health & Safety

No Action

The Proposed Action would not be implemented. NNIPS treatments included in approved watershed level projects would continue to be implemented. Potential effects on public health and safety (similar to those described below) would be confined within these project areas.

Proposed Action

Manual, Mechanical & Cultural Methods

With the exception of accidental worker injury (from chainsaw, axe, etc.), there would be no effects from manual and mechanical methods on public health and safety. Occasional brief exposure of the general public to low concentrations of drift smoke is more a temporary inconvenience than a health problem. High smoke concentrations can, however, be a very serious matter. Human health effects related to particulate matter in smoke include: increased premature deaths; aggravation of respiratory system or cardiovascular illnesses; and changes in lung function, structure, and natural defense. Smoke also becomes a safety issue when it affects visibility on roadways. Smoke can also have a nuisance odor.

Residents near burn areas might experience some respiratory discomfort; however, it is expected that most impacts would be in the form of nuisance smoke. Since prescribed fire use would be limited to small, concentrated infestations, smoke from the proposed burning and the associated emissions would occur in the local area for a relatively short time depending on the weather conditions.

Design criteria specific to prescribed burning activities (p. 18) would reduce health and safety risks.

Chemical Methods

SERA (Syracuse Environmental Research Associates, Inc.) Human Health and Ecological Risk Assessments were used to analyze the risks associated with the herbicides proposed for treatment. Site-specific risk assessments developed by SERA have been conducted for this project as required by the Revised Forest Plan (p 87, HU002) and are located in the project file.

Estimates of risk are presented in terms of a hazard quotient (HQ). An HQ is the quotient of an estimate of exposure divided by the appropriate toxicity value. Concern for the development of adverse effects increases as the value of the HQ increases.

Aminopyralid may be used at an application rate of 0.11 lb/acre to control broadleaf weeds. At this rate, the risk assessment indicates the use of imazapyr does not pose any identifiable hazard to workers or the general public in Forest Service applications. Hazard quotients are at acceptable levels (less than 1) for all exposure scenarios.

2,4-D use should be limited to situations where other herbicides are ineffective or to situations in which risks can be mitigated.

Based on upper bound hazard quotients, adverse health outcomes are possible for workers who could be exposed repeatedly over a long-term period of exposure. Hazard quotients for workers spraying at the typical application rate of 1 lb a.e./acre is 16 for backpack spray application. Short-term accidental exposures via contaminated gloves as well as some spill scenarios yield hazard quotients that are of concern, particularly for the scenario involving contaminated gloves that are worn for 1 hour which yields a hazard quotient of 94. For all of these hazard quotients, the magnitude of the hazard quotient is linearly related to the application rate.

As with hazard quotients for workers, hazard quotients for members of the general public are linearly related to application rate. Upper bound hazard quotients for accidental exposures associated with spills into a small body of water range from 1.6 (consumption of fish by an adult male) to 82 (a child consuming 1 liter of contaminated water).

Short-term consumption of contaminated fruits and vegetables could be of concern when either maternal toxicity or acute neurotoxicity are the endpoints of concern under assessment. Upper bound hazard quotients associated with the typical application rate of 1 lb a.e./acre are 7 for consumption of contaminated fruit and 54 for consumption of contaminated vegetation. These estimates are based on an adult female.

The only hazard quotients indicating that adverse health outcomes are plausible following longer-term exposure to 2,4-D are those associated with ingestion of contaminated fruits and vegetation by an adult female. At the typical application rate of 1 lb a.e./acre, the central estimate of the hazard quotient for the consumption of contaminated vegetation is 5 with lower and upper bounds of 1 and 38. Because lower residues are anticipated on contaminated fruit, the hazard quotient associated with this scenario at an application rate of 1 lb a.e./acer is 0.3 with an upper bound of 5. Other longer-term exposure scenarios involving the consumption of either contaminated water or fish yield hazard quotients that are substantially below a level of concern.

Chlorsulfuron may be used at a typical rate of 0.056 lbs/acre. It would generally be applied as a foliar application to broadleaf weeds. For both workers and members of the general public, typical exposures do not lead to estimated doses that exceed a level of concern. For members of the general public, the upper limits for hazard quotients are below a level of concern except for chronic, long-term consumption of contaminated vegetation by an adult female.

Clopyralid may be used at a typical application rate of 0.35 lb/acre. It would generally be applied as a foliar application to broadleaf weeds. Based on the estimated levels of exposure and the criteria for acute and chronic exposure developed by the U.S. EPA, there is no evidence that typical or accidental exposures would lead to dose levels that exceed the level of concern for workers. For members of the general public, hazard quotients exceed the level of concern for consumption of water by a child after an accidental spill, and chronic exposure to contaminated vegetation by an adult female.

Dicamba may be used at a typical application rate of 0.3 lb/acre. It may be used for cut-surface and foliar application to broadleaf weeds and woody vegetation. At the typical application rate, workers would not be exposed to levels that exceed a level of concern. Hazard quotients would exceed the level of concern for members of the general public in the following scenarios: direct spray of a child's whole body, water consumption by a child after an accidental spill, and consumption of contaminated vegetation by an adult female.

Fluroxypyr may be used at a rate of 0.5 pound/acre. It would generally be applied as a foliar application to weeds and woody brush. Typical exposures to fluroxypyr do not lead to estimated doses that exceed a level of concern. For workers, no exposure scenarios generate a level of concern even at the upper ranges of estimated dose. For members of the general public, the upper limits for hazard quotients are below a level of concern except for the accidental spill of a large amount (> 200 gallons) of fluroxypyr into a very small pond. Immediate consumption of water from this pond would reach a level of concern as well as fish consumption by subsistence populations.

Glyphosate may be used at an application rate of 2 lbs/acre. It would generally be applied as a foliar application to weeds and woody brush. Hazard quotients are at acceptable levels (less than 1) for all exposure scenarios except for the following: water consumption by a child after an accidental spill, and consumption of contaminated vegetation by an adult female.

Imazapic may be used at an application rate of 0.188 lb/acre. It would generally be applied as a foliar application to weeds. Hazard quotients are at acceptable levels (less than 1) for all exposure scenarios except for the following: water consumption by a child after an accidental spill.

Imazapyr may be used at an application rate of 1.5 lb/acre. It would generally be applied as a foliar application to weeds and brush species. At this rate, the risk assessments indicate the use of imazapyr does not pose any identifiable hazard to workers or the general public in Forest Service applications. Hazard quotients are at acceptable levels (less than 1) for all exposure scenarios.

Metsulfuron Methyl may be used at an application rate of 0.15 lb/acre. It would generally be applied as a foliar spray to weeds and woody plants. For workers, no exposure scenarios exceed the level of concern. For members of the general public, all hazard quotients are below the level of concern.

Picloram may be used at an application rate of 1.0 lb/acre as a foliar spray; it may only be used to control kudzu. For workers, hazard quotients are below a level of concern (less than 1) for all exposure scenarios. For members of the general public, hazard quotients are at acceptable levels (less than 1) for all exposure scenarios except for the following: water consumption by a child after an accidental spill, and consumption of contaminated vegetation by an adult female.

Sulfometuron methyl may be used at an application rate of 0.38 lb/acre as a foliar spray on broadleaf weeds and grasses. For workers, no exposure scenarios exceed the level of concern. For members of the general public, all hazard quotients are below a level of concern.

Triclopyr triethylamine (salt) may be applied at a rate of 4 lbs/acre for cut-surface treatments; triclopyr butoxyethyl (ester) may be applied at a rate of 2 lbs/acre for foliar spray. Triclopyr is used to control herbaceous and woody broadleaf weeds.

At the central and upper bounds of the estimated exposures for workers using a backpack sprayer application method, the hazard quotients for both triclopyr amine and triclopyr ester formulations exceed the level of concern, ranging from 1 to 12. The level of concern is also exceeded for accidental exposure to contaminated gloves for one hour at the central and upper bounds of exposure to triclopyr ester.

For the general public, several exposure scenarios exceed the level of concern. Hazard quotients for direct spray of a child's whole body and direct spray to the feet and lower legs of an adult female range from 1.4 to 3. For an adult female consuming contaminated vegetation, the upper bound HQ is 108 for acute exposures and 26 for longer-term exposures. In addition, some of the central estimates of exposure to triclopyr involving a young woman consuming contaminated vegetation or fruit also exceed the level of concern. Because triclopyr has been shown to cause adverse developmental effects in mammals, high HQs associated with terrestrial applications are of particular concern in terms of the potential for adverse reproductive outcomes in humans. Adverse developmental effects in experimental mammals have been observed, however, only at doses that cause frank signs of maternal toxicity. The available toxicity studies suggest that overt and severe toxicity would not be associated with any of the HQs and this diminishes concern for reproductive effects in humans (SERA 2011).

Table 3.1 on the following pages lists chemicals with hazard quotients at or above the level of concern and displays the values of exceedance for various exposure scenarios.

Human Hazard Quotients At or Above Level of Concern (Table 3.1)

Exposure Scenario	Receptor	2,4-D acid			Chlorsulfuron			Clopyralid			Dicamba			Fluroxypyr		
		C	L	U	C	L	U	C	L	U	C	L	U	C	L	U
Accidental																
Contaminated Gloves, 1 min	Worker			1.6												
Contaminated Gloves, 1 hr	Worker	15	1.3	94												
Spill on Hands, 1 hr	Worker															
Spill on lower legs, 1 hr	Worker															
General																
Backpack sprayer	Worker	3		16												
Acute																
Direct Spray, whole body	Child			7									1.7			
Direct Spray, feet and lower legs	Woman															
Vegetation Contact, shorts and T-shirt	Woman															
Contaminated Fruit	Woman			7												
Contaminated Vegetation	Woman	6	1.4	54									4			
Water consumption, accidental spill	Child		1.7	82						2			10			1.7
Water consumption, ambient	Child			2												
Swimming, ambient	Woman															
Fish consumption, accidental spill	Man			1.6												
Fish consumption, accidental spill	Subsistence	2		8										1		3
Chronic																
Contaminated Fruit	Woman			5												
Contaminated Vegetation	Woman	5		38			1.6			1.7			1.3			
Water consumption	Man															
Fish consumption	Man															
Fish consumption	Subsistence															

Human Hazard Quotients At or Above Level of Concern (Table 3.1 Cont.)

Exposure Scenario	Receptor	Glyphosate			Imazapic			Picloram			Triclopyr - amine			Triclopyr - ester		
		C	L	U	C	L	U	C	L	U	C	L	U	C	L	U
Accidental																
Contaminated Gloves, 1 min	Worker															
Contaminated Gloves, 1 hr	Worker													1.5		15
Spill on Hands, 1 hr	Worker															
Spill on lower legs, 1 hr	Worker															
General																
Backpack sprayer	Worker										1.1		6	1		12
Acute																
Direct Spray, whole body	Child															1.4
Direct Spray, feet and lower legs	Woman												1.8			3
Vegetation Contact, shorts and T-shirt	Woman															
Contaminated Fruit	Woman												15			7
Contaminated Vegetation	Woman			1.4							13		108	6		54
Water consumption, accidental spill	Child			2			1.9			1			8			4
Water consumption, ambient	Child															
Swimming, ambient	Woman															
Fish consumption, accidental spill	Man															
Fish consumption, accidental spill	Subsistence															
Chronic																
Contaminated Fruit	Woman												10			5
Contaminated Vegetation	Woman									2	1.3		26			13
Water consumption	Man															
Fish consumption	Man															
Fish consumption	Subsistence															

Prudent worker hygiene practices and project design criteria detailed in Chapter 2 (pp. 17-18) would reduce human health risks.

Accidents or other unforeseen events might occur during herbicide transportation, mixing, and application. Public safety in and around areas of herbicide use is a high priority concern. Measures are taken to help ensure that the general public does not come in contact with herbicides, which would eliminate the risk entirely. These include posting warning signs on areas that have been treated; selectively targeting vegetation that needs to be controlled rather than using broadcast application; establishing buffer zones of non-treatment around private property, streams, roads, and hiking trails; carefully transporting only enough herbicide for one day's use; mixing it on site away from private land, open water, or other sensitive areas; properly maintaining and operating equipment (e.g. no leaks); and having good accident pre-planning and emergency spill plans in place. In the event of an accidental spill, the Emergency Spill Plan (Forest Service Manual 2109 Chapter 30) would be followed. The Plan contains procedures for spill containment and cordoning off of the spill area. These measures are incorporated into contracts and through good enforcement and administration would be effective in reducing the risk of accidental contamination of humans or the environment.

Herbicide applications were monitored for effectiveness in protecting water quality over a five-year period on the Ouachita NF (Clingenpeel, 1993). The objective was to determine if herbicides are present in water in high enough quantities to pose a threat to human health or aquatic organisms. From 1989 through 1993, 168 sites and 348 water samples were analyzed for the presence of herbicides. Of those samples, 69 had detectable levels of herbicide. No concentrations were detected that would pose a meaningful threat to human health or aquatic organisms.

Soils

No Action

The Proposed Action would not be implemented. NNIPS treatments included in approved watershed level projects would continue to be implemented. Potential effects on soils (described below) would be confined within these project areas.

Proposed Action

Vegetation removal by any method could result in erosion by exposing the soil. The potential for erosion would be dependent on soil type, topography, size of the exposed area, and the amount of vegetation removed. Subsequent revegetation activities would also result in soil disturbance. Herbicides could affect soil productivity through biotic impacts. Depending on the application rate and soil environment, herbicides can stimulate or inhibit soil organisms (US Forest Service, 2005b). Negative effects from fire are mainly associated with severe burns, which may kill soil biota, alter soil structure, consume organic matter and remove site nutrients. Heavy equipment use has the potential to compact soil. Compaction increases soil bulk density and decreases porosity, reducing soil productivity. Limiting equipment use when soils are wet would reduce the risk of compaction.

Management Indicator Species and Habitat

As part of the overall effort to ensure that habitat requirements of all native vertebrates, invertebrates, and plants are considered in the planning, implementation, and monitoring of Forest management practices, the Revised Forest Plan lists 24 species that should adequately address the effects of Forest management practices on fish and wildlife populations and their habitat needs, as well as demand species and species of special interest. These species, termed "Management Indicator Species" (MIS), represent a broad array of habitats covering diverse geographic areas within the Ouachita National Forest, as well as inhabiting areas with diverse management objectives.

The Forest list was reviewed, and 22 species were selected as MIS for the actions proposed in this project (see Tables 3.2 and 3.3 below). Species not known to occur within the action area, lacking suitable habitat, or not tied to an appropriate evaluation objective were not selected.

Selected Terrestrial MIS and Associated Purposes (Table 3.2)

Life Form	Scientific Name	Common Name	Primary Reason for Selection *To help indicate effects of management on:*
Mammal	*Odocoileus virginianus*	White-tailed deer	meeting public hunting demand
Bird	*Colinus virginianus*	Northern bobwhite	meeting public hunting demand, and the pine-oak woodland community
Bird	*Dendroica discolor*	Prairie warbler	the early successional component of forest communities
Bird	*Meleagris gallopavo*	Eastern wild turkey	meeting public hunting demand
Bird	*Dryocopus pileatus*	Pileated woodpecker	snags and snag-dependent species
Bird	*Piranga olivacea*	Scarlet tanager	mature forest communities

Selected Aquatic MIS and Associated Purposes (Table 3.3)

Life Form	Scientific Name	Common Name	Primary Reason for Selection *To help indicate effects of management on:*
Fish	*Ameiurus natalis*	Yellow bullhead	aquatic habitat and water quality in streams within the Arkansas River Valley, Coastal Plains and Ouachita Mountain Ecoregions
Fish	*Campostoma anomalum*	Highland stoneroller	
Fish	*Ethestoma radiosum*	Orangebelly darter	
Fish	*Fundulus catenatus*	Northern studfish	
Fish	*Hypentilium nigricans*	Northern hogsucker	
Fish	*Lepomis cyanellus*	Green sunfish	
Fish	*Lepomis megalotis*	Longear sunfish	
Fish	*Luxilus chrysocephalus*	Striped shiner	
Fish	*Micropterus dolomieu*	Smallmouth bass	meeting public fishing demand in streams
Fish	*Micropterus salmoides*	Largemouth bass	obligate pond and lake species
Fish	*Lepomis macrochirus*	Bluegill sunfish	

White-tailed deer

No Action

The Proposed Action would not be implemented. NNIPS treatments included in approved watershed level projects would continue to be implemented. Potential effects (described below) would be confined within these project areas.

Proposed Action

Effects on individuals: Deer may be temporarily displaced from treatment areas during proposed activities. Adults are mobile; fawns could be injured by mechanical equipment, and from prescribed burning if implemented during fawning season.

Herbicide hazard quotients exceed the level of concern for the following exposure scenarios:

2,4-D - acute consumption of contaminated fruit, and long-term consumption of contaminated fruit and vegetation
Glyphosate - acute consumption of contaminated vegetation
Picloram - long-term consumption of contaminated vegetation
Triclopyr - acute and long-term consumption of contaminated fruit and vegetation

Effects on habitat: Eradication/removal activities and restoration/rehabilitation activities would reduce NNIS competition; native species would provide more beneficial browse.

Effects on forest-wide population trend: The Proposed Action would have an overall positive effect on the forest-wide population trend for this species by increasing foraging opportunities of native plants and browse.

Northern bobwhite

No Action

The Proposed Action would not be implemented. NNIPS treatments included in approved watershed level projects would continue to be implemented. Potential effects (described below) would be confined within these project areas.

Proposed Action

Effects on individuals: Mechanical equipment could crush individuals and eggs, as this species nests on the ground. Prescribed burning could also destroy nests, but adults and fledglings are highly mobile and would most likely leave from disturbance before fire could engulf them. Loss of nests and individuals could occur, but they would most likely renest.

Herbicide hazard quotients exceed the level of concern for the following exposure

scenarios:

Dicamba - acute consumption of contaminated vegetation and insects
Glyphosate - acute and long-term consumption of contaminated vegetation
Imazapyr - long-term consumption of contaminated vegetation
Picloram - acute and long-term consumption of contaminated vegetation
Triclopyr - acute consumption of contaminated insects; acute and long-term consumption of contaminated fruit and vegetation

Effects on habitat: Treatments would reduce the spread and decrease the abundance of NNIPS and their replacement of native food and cover plants. Native plants that provide nesting and hiding, and foods that ground-nesting birds have adapted to and utilize heavily, would increase in abundance and diversity.

Effects on forest-wide population trend:

The Proposed Action would have an overall positive effect on the forest-wide population trend for this species by increasing foraging opportunities of native plants and therefore, insects.

Prairie warbler

The effects would be the same as those described for the northern bobwhite above.

Eastern wild turkey

No Action

The Proposed Action would not be implemented. NNIPS treatments included in approved watershed level projects would continue to be implemented. Potential effects (described below) would be confined within these project areas.

Proposed Action

Effects on individuals: Turkeys may be temporarily displaced during resource management activities and nests may be abandoned. Prescribed burning and mechanical methods, such as mowing a wildlife opening, could damage or destroy eggs and nests if operations occur during nesting season and in nesting habitat. However, most work would take place outside the nesting season. Adults are highly mobile and poults are precocial and able to follow the hen within one to two days of hatching.
Hazard quotients exceed the level of concern for the following exposure scenarios:

Dicamba - acute consumption of contaminated vegetation and insects
Glyphosate - acute and long-term consumption of contaminated vegetation
Imazapyr - long-term consumption of contaminated vegetation
Picloram - acute and long-term consumption of contaminated vegetation
Triclopyr - acute consumption of contaminated insects; acute and long-term consumption of contaminated fruit and vegetation

Effects on habitat: Due to reduced stem density, conditions for nesting and brooding

would be improved. Any reduction in NNIPS would benefit the habitat for this species. Revegetation with native species would attract insects for the turkey and its young.

Effects on forest-wide population trend: The Proposed Action would have an overall positive effect on the forest-wide population trend for this species by increasing native foraging opportunities.

Pileated woodpecker

No Action

The Proposed Action would not be implemented. NNIPS treatments included in approved watershed level projects would continue to be implemented. Potential effects (described below) would be confined within these project areas.

Proposed Action

Effects on individuals: Other than possible disturbance, there would be no effects on individuals, eggs or nests from manual, mechanical, or cultural NNIPS treatment methods because these woodpeckers roost and nest in cavity trees or snags (standing dead trees). Growing season burns could destroy nests with eggs and nestlings if the cavity tree is damaged or felled due to burn-through, or perhaps abandoned if exposed to prolonged periods of smoke.

Logs and snags used as primary foraging substrate would not be treated with herbicides, however hazard quotients exceed the level of concern for the following exposure scenarios:

Dicamba - acute consumption of contaminated vegetation and insects
Glyphosate - acute and long-term consumption of contaminated vegetation
Imazapyr - long-term consumption of contaminated vegetation
Picloram - acute and long-term consumption of contaminated vegetation
Triclopyr - acute consumption of contaminated insects; acute and long-term consumption of contaminated fruit and vegetation

Effects on habitat: Reduction of NNIPS would benefit all species of native plants and reduction of competition would benefit those that produce insects. Habitat loss would most likely be due to temporary loss of some woody shrubs, and annual and perennial broadleaf herbaceous plant species that provide shelter and food sources for insect and spider populations that may contribute to this bird's diet. Prescribed fire could result in loss of large snags (and potential nest sites) felled as a result of burning activities. However, snags are rarely consumed, and if felled by burn-through would contribute to foraging substrate as logs. On rare occasions, hot spots within prescribed burns may cause tree mortality, eventually providing replacement snags that serve as vertical foraging substrate and potential cavity excavation sites.

Effects on forest-wide population trend: The Proposed Action would have a positive

effect on the forest-wide population trend for this species due to enhanced foraging habitat opportunities provided by the increase in native species.

Scarlet tanager

No Action

The Proposed Action would not be implemented. NNIPS treatments included in approved watershed level projects would continue to be implemented. Potential effects (described below) would be confined within these project areas.

Proposed Action

Effects on individuals: Other than sound disturbance for short periods of time, there would be no effects on individuals from manual and mechanical treatment methods because this species inhabits and nests in areas with a high canopy. Prescribed burning during the nesting season could temporarily displace adults or cause nest abandonment by adults. Prescribed fire would not be intense enough to destroy nests, eggs or nestlings because nests would be located well above ground level (Mowbray, 1999).

Although feeding occurs mid-canopy, herbicide hazard quotients exceed the level of concern for the following exposure scenarios:

Dicamba - acute consumption of contaminated vegetation and insects
Glyphosate - acute and long-term consumption of contaminated vegetation
Imazapyr - long-term consumption of contaminated vegetation
Picloram - acute and long-term consumption of contaminated vegetation
Triclopyr - acute consumption of contaminated insects; acute and long-term consumption of contaminated fruit and vegetation

Effects on habitat: Most NNIPS are not associated with the canopy used by this species.

Effects on forest-wide population trend: The Proposed Action would have no effect on the forest-wide population trend for this species; habitat would not be affected.

Fish Species

No Action

The Proposed Action would not be implemented. NNIPS treatments included in approved watershed level projects would continue to be implemented. Potential effects (described below) would be confined within these project areas.

Proposed Action

Effects on individuals: Mechanical, cultural, and chemical control activities may occur

within streamside management areas. These treatments would not have an effect on individuals because fish are found within the stream channel where these treatments do not occur.

Effects on habitat: Mechanical actions and prescribed burning may result in small amounts of sediment entering streams. Waterbodies should not be affected by herbicide treatments due to adherence to Revised Forest Plan design criteria, namely, the use of herbicides would not occur when weather conditions exceed the threshold for use that could cause drift, and no herbicide mixing, loading, or cleaning areas would occur within a 300-foot buffer of open water. Concentrations of any herbicide entering the aquatic ecosystem would be rapidly reduced by the mixing and diluting actions of flowing water.

Effects on forest-wide population trend: The Proposed Action would have no effect on forest-wide population trends of fish species.

Table 3.4 and **Table 3.5** on the following pages list chemicals with hazard quotients at or above the level of concern for terrestrial and aquatic species, and displays the values of exceedance for various exposure scenarios.

Terrestrial Species Hazard Quotients At or Above Level of Concern (Table 3.4)

Exposure Scenario	Receptor	2,4-D acid			Dicamba			Glyphosate			Imazapyr			Picloram			Triclopyr-amine			Triclopyr-ester		
		C	L	U	C	L	U	C	L	U	C	L	U	C	L	U	C	L	U	C	L	U
Acute/Accidental																						
Direct Spray	Small Mammal	1	1	1																		
Direct Spray	Honey Bee																					
Fruit	Mammal																1		4			1.9
Fruit	Bird																1.1		4			2
Vegetation	Small Mammal			1.7				1.6		8						3	1.3		6			3
Vegetation	Large Mammal			1.9						1.8							9		45	5		22
Vegetation	Bird						1.7	1.3		6						1.1	11	1.2	54	6		27
Water, accidental spill	Small Mammal																					
Insects	Small Mammal			3						1.1												
Insects	Bird						2										1.4		7			4
Fish, accidental spill	Large Mammal																		1.3			
Fish, accidental spill	Bird																					
Small Mammal	Mammal	1.9	1.9	1.9																		
Small Mammal	Bird																					
Chronic/Long-Term																						
Fruit	Mammal																			4		25
Fruit	Bird																1.1		4	4		23
Vegetation	Small Mammal									1.3						12	3		30			15
Vegetation	Large Mammal			1.4												3	19		213	6		106
Vegetation	Bird							3		13			1.4			9	19		216	6		108
Water	Small Mammal																					
Fish	Bird																					

Aquatic Species Hazard Quotients At or Above Level of Concern (Table 3.5)

Exposure Scenario	Receptor	2,4-D acid			Dicamba			Fluroxypyr			Glyphosate			Imazapyr		
		C	L	U	C	L	U	C	L	U	C	L	U	C	L	U
Accidental Spill	Sensitive Fish										189	15	757			1.7
Peak EEC[1]	Sensitive Fish												3			
Longer-term EEC	Sensitive Fish															
Accidental Spill	Tolerant Fish										18	1.5	73			
Peak EEC	Tolerant Fish															
Longer-term EEC	Tolerant Fish															
Accidental Spill	Sensitive Invertebrate						2				121	10	484			
Peak EEC	Sensitive Invertebrate							6		20			2			
Longer-term EEC	Sensitive Invertebrate															
Accidental Spill	Tolerant Invertebrate										4		16			
Peak EEC	Tolerant Invertebrate															
Longer-term EEC	Tolerant Invertebrate															
Accidental Spill	Sensitive Amphibian			2							227	18	908			
Peak EEC	Sensitive Amphibian												4			
Longer-term EEC	Sensitive Amphibian															
Accidental Spill	Tolerant Amphibian										3		14			
Peak EEC	Tolerant Amphibian															
Longer-term EEC	Tolerant Amphibian															

1-Estimated environmental concentration

Aquatic Species Hazard Quotients At or Above Level of Concern (Table 3.5 Cont.)

Exposure Scenario	Receptor	Picloram			Sulfometuron Methyl			Triclopyr - amine			Triclopyr - ester		
		C	L	U	C	L	U	C	L	U	C	L	U
Accidental Spill	Sensitive Fish	8		96						4	40	5	399
Peak EEC[1]	Sensitive Fish												
Longer-term EEC	Sensitive Fish			3									
Accidental Spill	Tolerant Fish			3							5		48
Peak EEC	Tolerant Fish												
Longer-term EEC	Tolerant Fish												
Accidental Spill	Sensitive Invertebrate			8						3	81	10	807
Peak EEC	Sensitive Invertebrate												1.3
Longer-term EEC	Sensitive Invertebrate												
Accidental Spill	Tolerant Invertebrate										1		10
Peak EEC	Tolerant Invertebrate												
Longer-term EEC	Tolerant Invertebrate												
Accidental Spill	Sensitive Amphibian						2				36	5	363
Peak EEC	Sensitive Amphibian												
Longer-term EEC	Sensitive Amphibian												
Accidental Spill	Tolerant Amphibian						2						9
Peak EEC	Tolerant Amphibian												
Longer-term EEC	Tolerant Amphibian												

1-Estimated environmental concentration

Proposed, Threatened, Endangered, and Sensitive Species

Eighty PETS species were reviewed for occurring or potentially occurring in the analysis area (Regional Forester's Sensitive Species list, Forest Service's Sensitive Species List, Arkansas natural Heritage Commission inventories of PETS species locations). The table below lists PETS species that occur or potentially occur in the analysis area, and would be affected by proposed project activities.

PETS Species Considered (Table 3.6)

Group	Common Name	Scientific Name	Classification*
Mammal	Northern long-eared bat	*Myotis septentrionalis*	Threatened
Mollusk	Arkansas fatmucket	*Lampsilis powellii*	Threatened
Mollusk	Scaleshell	*Leptodea leptodon*	Endangered
Mollusk	Spectaclecase mussels	*Cumberlandia monodonta*	Endangered
Mammal	Small-footed myotis	*Myotis leibii*	Sensitive
Mammal	Southeastern myotis	*Myotis austroriparius*	Sensitive
Mammal	Tricolored bat	*Perimyotis subflavus*	Sensitive
Bird	Bachman's sparrow	*Aimophla aestivalis*	Sensitive
Amphibian	Caddo Mtn. salamander	*Plethodon caddoensis*	Sensitive
Insect	Monarch butterfly	*Danaus plexippus*	Sensitive
Insect	Frosted elfin	*Callophrys irus*	Sensitive
Fish	Caddo madtom	*Noturus taylori*	Sensitive
Fish	Ouachita darter	*Percina brucethompsoni*	Sensitive
Fish	Ouachita madtom	*Noturus lachneri*	Sensitive
Fish	Paleback darter	*Etheostoma pallididorsum*	Sensitive
Fish	Peppered shiner	*Notropis perpallidus*	Sensitive
Crustacean	Mena crayfish	*Orconectes menae*	Sensitive
Mollusk	Elktoe	*Alasmidonta marginata*	Sensitive
Mollusk	Purple lilliput mussel	*Toxolasma lividum*	Sensitive
Mollusk	Western fanshell	*Cyprogenia aberti*	Sensitive
Mollusk	Southern hickorynut	*Obovaria arkansasensis*	Sensitive
Plant	Arkansas alumroot	*Heuchera villosa var. arkansana*	Sensitive
Plant	Arkansas (Browne's) waterleaf	*Hydrophyllum brownie*	Sensitive
Plant	Church's wildrye	*Elymus churchii*	Sensitive
Plant	Cossatot leafcup	*Polymnia cossatotensis*	Sensitive
Plant	Cumberland sandreed	*Calamovifla arcuata*	Sensitive
Plant	Gulf pipewort	*Eriocaulon korrnickianum*	Sensitive
Plant	Mackenzie's blue wildrye	*Elymus glaucus ssp. Mackenziei*	Sensitive
Plant	Maple-leaved oak	*Quercus acerifolia*	Sensitive
Plant	Moore's delphinium	*Delphinium newtonianum*	Sensitive
Plant	Narrowleaf ironweed	*Vernonia lettermannii*	Sensitive
Plant	Nuttall's cornsalad	*Valerianella nuttallii*	Sensitive

Plant	Open ground draba	*Draba aprica*	Sensitive
Plant	Ouachita false indigo	*Amorpha ouachitensis*	Sensitive
Plant	Ouachita Mtn. goldenrod	*Solidago ouachitensis*	Sensitive
Tree	Ozark chinquapin	*Castanea pumila* var. *ozarkensis*	Sensitive
Plant	Ozark least trillium	*Trillium pusillum ozarkanum*	Sensitive
Plant	Palmer's cornsalad	*Valerianella palmeri*	Sensitive
Plant	Pineoak jewelflower	*Streptanthus squamiformis*	Sensitive
Plant	Sedge	*Carex timida*	Sensitive
Plant	Shinner's sunflower	*Helianthus occidentalis* ssp. *plantagineus*	Sensitive
Plant	Southern lady's-slipper	*Cypripedium kentuckiense*	Sensitive
Plant	Texas fescue	*Festuca versuta*	Sensitive
Plant	Waterfall's sedge	*Carex latebracteata*	Sensitive

* Sensitive: U.S. Forest Service Designation

Mammals

Northern long-eared bat (NLEB), Small-footed myotis, Southeastern myotis, Tricolored bat

Direct and Indirect Effects

Direct effects would be minimum, due to these bats' emergence times, it is highly unlikely that individuals themselves would come into contact with recently sprayed vegetation. By dusk, herbicides should be dried on the substrate on which they were sprayed (Lacki et al. 2007). However, there is a possibility that these bats can consume insects that have been contaminated or sickened by the herbicide treatments. Herbicides would be applied at the lowest effective rate in meeting project objectives in an attempt to reduce any potential negative effects to the environment. All label instructions, Forest Plan standards and guidelines will be followed. It is unlikely that these bats' would exceed the risk factors (LD_{50} and LC_{50} values) established in the risk assessments for small mammals by foraging in an areas where NNIS has been chemically treated. Prescribed burns may occur during both the dormant and growing seasons. During dormant season burns, these bats are generally found in hibernacula, such as caves, and no direct effects are expected. During growing season burns, bats may be displaced from existing roosts due to smoke intrusion and human disturbance. However, bats, particularly the NLEB, switch roost trees every 2-4 days and are capable of escaping danger, so effects are unlikely. If burns occur during the lactation period, mortality may occur in non-volant young, which are incapable of escaping burn areas (Perry 2011). Mechanical methods of removal are expected to have direct effects, as some live trees (tree of heaven) are a target for mechanical removal.

Positive indirect effects would occur from implementation of the proposed action. Herbicide application, prescribed fire, and mechanical removal would decrease NNIPS and allow an increase in native vegetation, resulting in the overall enhancement of wildlife habitat (Guynn et al. 2004). In studies conducted in the southeastern United States, herbicide application combined with a regular prescribed burn rotation restored

forests to their native overstory pine/understory grass communities, producing preferred bat habitat. (Guynn et al. 2004, Perry and Thill 2007, Perry et al. 2007, Lacki et al. 2009). Prescribed burning activities may improve habitat for the insect prey base of these species by maintaining an open understory predominated by native vegetation. Smoke intrusion into hibernacula has the potential to rouse bats from hibernation, though mortality is unlikely (Perry 2011).

Cumulative Effects

Other projects which would be expected to occur within the project area include timber harvest, additional prescribed burning, and midstory removal. All of these activities would improve their habitat. The proposed project would have a negligible effect on these bats and their habitat due to roadsides being the primary focus of NNIPS removal within occupied and suitable habitat. The proposed project would not provide any long-term negative impacts to these bats or their habitat. There are no known planned actions on private lands that would add to any cumulative effects.

Mollusk and Crustacean

Arkansas fatmucket, Scaleshell, Spectaclecase, Elktoe, Purple lilliput mussel, Western fanshell, Southern hickorynut, Mena crayfish

Direct and Indirect Effects

Whereas most NNIS control methods will be implemented in upland habitat infested with NNIS and on roadsides, manual, mechanical, cultural and chemical control activities may occur within MA 9 – Water and Riparian Communities. Mechanical and cultural treatments would not have a direct effect because these species are found within the stream channel where these treatments do not occur.

These species would not be affected by herbicide treatments because the use of herbicides is prohibited when weather conditions exceed the threshold for use that could cause drift (HU015, Table 3.8, pp. 88-89); the locations of these species are well documented and no herbicide mixing, loading, or cleaning areas would occur within a 300-foot buffer of open water, source waters (public water supply), wells, or other sensitive areas.

Indirect effect may include minor sedimentation if mechanical and/or cultural methods are used, however the standard use of Best Management Practices (BMPs) should minimize such occurrences. Due to the restricted amount and duration of activities, in addition to staying off the immediate stream banks, the effects are expected to be minor. Beneficial impacts would be a reduction in invasive non-native plant populations and the restoration of the natural plant communities. Implementing the proposed action would, over time, decrease the cover of noxious weeds, and increase the cover of desirable plant species and improve the overall health of the forest.

Cumulative Effects

Other projects which would be expected to occur within the proposed project area include timber harvest, additional prescribed burning and midstory removal. These activities have the potential to introduce sediment into the rivers and creeks, though expectations for this to occur are minimal due to Ouachita National Forest Plan Standards and Guidelines in place for protection of the riparian zones. The proposed project would not provide any long-term negative impacts to these aquatic species. The concentrations of any herbicide entering the aquatic ecosystem would be rapidly reduced by the mixing and diluting actions of flowing water. These herbicides are considered to have no cumulative effects on aquatic species (USDA-Forest Service 2005c, p. 47; USDI-Fish and Wildlife Service 2005a, 2007), which would be expected to be similar effects to mussels and the aquatic environment. There are no known planned actions on private lands that would add to any cumulative effects.

Birds

Bachman's sparrow

Direct and Indirect Effects

Direct effects of herbicide application and mechanical treatments on nests with eggs or nestlings are not likely to occur, because the primary target of applications would be unrestored areas that are choked with invasive plants and roadsides. These areas are typically beyond the useful conditions for this bird due to a lack of native grass and herbaceous plants important for nest construction and concealment. However, individual nests could be affected if they were located near a road. If herbicides were used in the vicinity of birds, acute oral and dietary studies of the listed chemicals exhibit a range in analysis toxicity from practically nontoxic to slight toxicity to birds. Fire also may cause mortality to non-mobile individuals if prescribed burns were conducted during the breeding season. Adults and fledglings are highly mobile and would not be directly impacted by any of the treatments.

Indirect effect of herbicide application has the potential to temporarily negatively impact foraging and nesting opportunities in small, specific treatment areas by reducing the availability of seeds from woody plants and broadleaf herbaceous species contacted by herbicide. Treatment of individual targeted plants would reduce the potential impact to non-target, beneficial vegetation. Some but not all of these herbicides affect grasses. However, without using herbicide, non-native plant populations, which have little to no benefit to wildlife, may increase in density. Mechanical treatments and fire may decrease the density of undesirable species and increase the density of desirable forage and cover species.

Cumulative Effects

Other projects expected to occur in the foreseeable future within the proposed project area include timber harvest, additional prescribed burning and midstory removal. These activities provide a positive long term effect of the Bachman's sparrow because it further opens the forest and promotes the increased forest characteristics and herbaceous layers that benefit this species. This would provide increased suitable foraging and breeding habitat for the Bachman's sparrow. The proposed project would not provide any long-term negative impacts to the Bachman's sparrow or its habitat.

Amphibian

Caddo Mountain salamander

It would be unlikely that manual methods of controlling NNIS would directly have an impact on the Caddo Mountain salamander due to discountable amounts of ground disturbance occurring using these methods. The use of prescribed fire to control NNIS poses a slight risk of an impact to this salamander if individuals are unable to find suitable cover when the flame front passes. However, most salamanders would likely seek cover underground as the fire passes above. It is doubtful that this salamander would be harmed if chemical methods were used to control NNIS. This is because herbicide to salamander contact would likely be limited by both vegetation intercepting the herbicide and the fact that Caddo Mountain salamanders find suitable habitat in rocky slopes and rotten logs. Some ground disturbance is expected with the implementation of mechanical methods of controlling NNIS. Mechanical treatments could injure or kill some individuals if these treatments take place in suitable Caddo Mountain salamander habitat.

However, indirect impacts should be minimum due to habitat protection measures in the Forest Plan for riparian areas preferred by this salamander. In addition, the Caddo Mountain salamander often inhabits rough terrain unsuitable for mechanical treatment methods, further limiting impacts to this species. Short term impacts of controlling NNIS may negatively alter habitat for this species by temporarily reducing shade on the forest floor causing suitable Caddo Mountain salamander habitat to become dry. Snice NNIS treatment units are usually relatively small areas, recolonization is likely after suitable native habitat becomes reestablished. The reestablishment of native habitat would result in long-term benefits for this salamander.

Cumulative Effects

Other projects which would be expected to occur within the proposed project area include timber harvest, additional prescribed burning and midstory removal. These activities would protect overall forest health and provide long-term, mesic, closed-canopy habitat in streamside management areas and seep/springs preferred by these salamanders. Sedimentation should not cumulatively affect this terrestrial species, since it is not dependent on aquatic systems for its life cycle. The proposed project would not provide any long-term negative impacts to this species. The concentrations of any herbicide

entering the aquatic ecosystem would be rapidly reduced by the mixing and diluting actions of flowing water. These herbicides are considered to have no cumulative effects on this species (USDA-Forest Service 2005c, p. 47; USDI-Fish and Wildlife Service 2005a, 2007), which would be expected to be similar effects to amphibians and the aquatic environment. There are no known planned actions on private lands that would add to any cumulative effects.

Insects

Monarch butterfly and frosted elfin

Direct and Indirect Effects

Direct effects of herbicide application, and mechanical and cultural treatments on butterfly eggs are not likely to occur, because the primary target of applications would be unrestored areas that are choked with invasive plants. These areas are typically beyond the useful conditions for these butterfly due to a lack of native nectar producing plants and host plants. However, there is the possibility of impacting eggs and larvae if treatment occur during the reproductive season. If herbicide were used in the vicinity of butterflies, acute oral and dietary studies of the listed chemicals exhibit a range on analysis toxicity from nontoxic to relatively nontoxic to invertebrates. Fire also may cause mortality to caterpillars and eggs if prescribed burns were conducted when Monarchs and frosted elfin were in these stages. Adults are highly mobile and would not be directly impacted by any of the treatments.

Indirect effects of herbicide application would most likely come in the temporary loss of some woody shrubs, and annual and perennial broadleaf herbaceous plant species that provide shelter and food sources for these butterfly species. Mechanical treatments would target non-native invasive species that are less likely to be used by the butterflies. The decrease in cover of non-native species may result in an increase in native species cover expanding suitable habitat for the butterfly that would be "beneficial" in the long-term.

Cumulative Effects

Other projects expected to occur in the foreseeable future within the proposed project area include timber harvest, additional prescribed burning, and midstory removal. These activities provide a positive long term effect these butterflies because it further opens the forest and promotes the increased growth of nectar producing plants and flowers. This would provide increased suitable forging and breeding habitat for these butterflies. The proposed project would not provide and long-term negative impacts to these butterflies or its habitat.

Fish

Caddo madtom, Ouachita darter, Ouachita madtom, Paleback darter, Peppered shiner

Mechanical, cultural, and chemical control activities may occur within streamside and riparian zones. Mechanical and cultural treatments would have no direct effects as these treatments do not occur directly in watercourses. Herbicide application methods, including direct application to target foliage or to freshly cut stumps/surfaces, would minimize the possibility of direct contamination to non-target species. Fish would not be expected to be affected by herbicide treatments because 1) the use of herbicides will not occur when weather conditions exceed the threshold for use that could cause drift (HU015, Table 3.8, pp. 88-89); and 2) no herbicide mixing, loading, or cleaning areas will occur within a 300-foot buffer to open water, source waters (public water supply), wells, or other sensitive areas. Prior to conducting NNIPS treatments on National Forest lands, site-specific documentation for each action would be prepared including an evaluation for the presence of fish populations and habitat and a determination of the best treatment method. Documents will be retained by the Caddo/Womble Ranger District. No mechanical, cultural, or herbicide treatments will be used unless it is determined that the potential benefits significantly outweigh the potential negative effects.

Indirect effects may include minor to insignificant sedimentation if mechanical and/or cultural methods are used. Due to the restricted amount and duration of activities, in addition to staying off the immediate stream banks, the effects are expected to be extremely minor and insignificant. Indirect beneficial effects would be a reduction in invasive non-native plant populations and the restoration of the natural plant communities. Implementing the proposed action would, over time, decrease the cover of noxious weeds, and increase the cover of desirable plant species and improve the overall health of the forest.

Cumulative Effects

Other projects which would be expected to occur within the proposed project area include timber harvest, additional prescribed burning and midstory removal. These activities have the potential to introduce sediment into the rivers and creeks, though expectations for this to occur are minimal due to Ouachita National Forest Plan Standards and Guidelines in place for protection of the riparian zones. The proposed project would not provide any long-term negative impacts to these aquatic species. The concentrations of any herbicide entering the aquatic ecosystem would be rapidly reduced by the mixing and diluting actions of flowing water. These herbicides are considered to have no cumulative effects on aquatic species (USDA-Forest Service 2005c, p. 47; USDI-Fish and Wildlife Service 2005a, 2007), which would be expected to be similar effects to mussels and the aquatic environment. There are no known planned actions on private lands that would add to any cumulative effects.

Sensitive Plants Tolerant to Moderate Disturbance

Ozark chinquapin, Shinner's sunflower, Waterfall's sedge, Pineoak jewelflower

Direct and Indirect Effects

Target areas for most herbicide application would occur in areas that are suffocated with invasive plants and along roadsides; it is possible that these treatments could occur in MA 6 – Rare Upland Communities. The use of prescribed fire to control NNIS may directly impact individual plants. However, prescribed fire impacts should be minimal since these species appear to tolerate practices that mimic natural disturbance so species viability and distribution are not anticipated to be significantly impacted. Mechanical treatments could impact individual plants through uprooting or by burying plants under displaced soils. Herbicide application methods, including direct application to target foliage or to freshly cut stumps/surfaces, would minimize the possibility of direct contamination to non-target species. Effects to sensitive plants would be further minimized because 1) the use of herbicides is prohibited when weather conditions exceed the threshold for use that could cause drift (Revised Forest Plan, HU015, Table 3.8, pp. 88-89) and 2) locations of these sensitive plants within the project areas are documented. Prior to conducting NNIPS treatments on National Forest lands, site-specific documentation for each action would be prepared, including an evaluation for the presence of sensitive populations and habitat and a determination of the best treatment methods. This document will be retained by the Caddo/Womble Ranger District.

Direct effects to Ozark chinquapin are unlikely due to its rare occurrence in areas where most applications of herbicide would occur. This tree's physical form is easily recognized allowing avoidance in known locations planned for invasive species control by mechanical and herbicide application. The Revised Forest Plan (TE008, p. 77) states, "Herbicides will not be applied to Ozark chinquapin, and stems of this species will be individually flagged or otherwise marked in the field by qualified personnel prior to herbicide application within the stand. Use of soil active, mobile herbicides should not be applied where they might move to the root system of this species" (USDA-Forest Service 2005a). If foliar application is used, a buffer of 30 feet would be required if trees are found and flagged in an application area. Fire may top-kill individual plants, but Ozark chinquapin has the ability to resprout. When Chinquapins respond well to an increased level of light and a reduction in competition for water, space, and nutrients when competing vegetation is reduced by herbicide.

Broadcast herbicide in roadside ditches could indirectly affect these species because it may be sprayed if it occurs alongside an NNIPS such as lespedeza, resulting in the possibility that individuals could be killed. The greatest threat to these species, like Waterfall's sedge, Shinner's sunflower, Ozark chinquapin and pineoak jewelflower, is habitat loss due to the encroachment of woody and non-native invasive herbaceous species into these habitats. The herbicide application to invasive vegetative species and the removal of woody species would improve habitat quality by increasing light to the forest floor, decreasing competition.

Cumulative Effects

Other projects expected to occur in the foreseeable future within the proposed project area include timber harvest, prescribed burning and midstory removal. Timber harvest and midstory removal provides a positive effect to Waterfall's sedge because it opens the forest and promotes the increased growth of grasses, forbs, and herbaceous plants. Waterfall's sedges are routinely found in open pine habitats (Bastarache, pers. Obs.: Howery, 2001). Negative cumulative effects are not expected due to the rarity of these species on the landscape, unlikely occurrence within proposed treatment areas, and its positive response to the proposed management activities.

Sensitive Plants Species of Streamside Management Areas

Cumberland sandreed, Ouachita false indigo, Arkansas alumroot, Narrowleaf ironweed, Southern lady's slipper, Browne's waterleaf

Target areas for most herbicide application would occur in areas that are suffocated with invasive plants and along roadsides; it is possible that these treatments could occur in MA 9 – Water and Riparian Communities. Individual plants could be directly impacted if prescribed burning and or heavy equipment was used as a control treatment during growing season. Herbicide application methods, including direct application to target foliage or to freshly cut stumps/surfaces, would minimize the possibility of direct contamination to non-target species. Effects to sensitive plants would be further minimized because 1) the use of herbicides is prohibited when weather conditions exceed the threshold for use that could cause drift (Revised Forest Plan, HU015, Table 3.8, pp. 88-89) and 2) locations of these sensitive plants within the project area are documented. Prior to conducting NNIPS treatments on National Forest lands, site-specific documentation for each action would be prepared, including an evaluation for the presence of sensitive populations and habitat and a determination of the best treatment methods. This document will be retained by the Caddo/Womble Ranger District.

Broadcast herbicide in roadside ditches could indirectly affect these species because it may be sprayed if it occurs alongside an NNIPS such as lespedeza, resulting in the possibility that individuals could be killed. The greatest threat to these riparian species is habitat loss due to the encroachment of invasive plants. The herbicide application to invasive species and the removal of woody species, and application of fire would improve habitat quality by increasing light to the forest floor and decreasing competition. The result is a positive effect for all sensitive plant populations

Cumulative Effects

Prescribed burning is the only other activity that is occurring within the project area. Other activity treatments like timber harvest and midstory removal would likely have no

cumulative effect on these riparian plant species due to the implementation of Revised Forest Plan Standards for protection of streamside zones.

Sensitive Plants Species of Glade and Similar Habitat

Open-ground draba, Nuttall's cornsalad, Palmer's cornsalad, Mapleleaf oak, Mackenzie's blue wildrye, Gulf pipewort, Sedge, Texas fescue, Church's wildrye, Cossatot leafcup, Moore's delphinium

Whereas target areas for most herbicide application and mechanical treatment would occur in unrestored areas that are choked with invasive plants and along roadsides; it is possible that these treatments could occur in MA 6 - Rare and Upland Communities. Individual plants could be directly impacted if prescribed burning and or heavy equipment was used as a control treatment during growing season. Herbicide application methods, including direct application to target foliage or to freshly cut stumps/surfaces, would minimize the possibility of direct contamination to non-target species. Effects to sensitive plants would be further minimized because 1) the use of cause drift (Revised Forest Plan, HU015, Table 3.8, pp. 88-89) and 2) locations of these sensitive plants within the project area are documented. Prior to conducting NNIPS treatments on National Forest lands, site-specific documentation for each action would be prepared, including an evaluation for the presence of sensitive populations and habitat and a determination of the best treatment methods. This document will be retained by Caddo/Womble Ranger District.

Broadcast herbicide in roadside ditches could indirectly affect these species because it may be sprayed if it occurs alongside an NNIPS such as lespedeza, resulting in the possibility that individuals could be killed. The greatest threat to glade species is habitat loss due to the encroachment of non-native invasive herbaceous species into open glade areas. The herbicide application to invasive vegetative species and the removal of woody species would improve habitat quality by increasing light to the forest floor, decreasing competition. The result is a positive effect for all sensitive plant populations.

Cumulative Effects

Other projects expected to occur in the foreseeable future within the proposed project area include timber harvest, additional prescribed burning, and midstory removal. Timber harvest activities would not occur in MA6 due to its shallow soils and typically very rocky surface such as shales. Prescribe burning and midstory removal will impact individuals, but by reducing competition would allow these species opportunity for seeding and new growth which would be beneficial to these species long-term.

Sensitive Plants Species of Mesic Hardwoods and Similar Habitat

Ouachita Mountain goldenrod and Ozark least trillium

Direct and Indirect Effects

Whereas target areas for most herbicide application and mechanical treatment would occur in unrestored areas that are choked with invasive plants and along roadsides; it is possible that these treatments could occur in MA 6 - Rare and Upland Communities. Individual plants could be directly impacted if prescribed burning and or heavy equipment was used as a control treatment during growing season. Herbicide application methods, including direct application to target foliage or to freshly cut stumps/surfaces, would minimize the possibility of direct contamination to non-target species. Effects to sensitive plants would be further minimized because 1) the use of cause drift (Revised Forest Plan, HU015, Table 3.8, pp. 88-89) and 2) locations of these sensitive plants within the project area are documented. Prior to conducting NNIPS treatments on National Forest lands, site-specific documentation for each action would be prepared, including an evaluation for the presence of sensitive populations and habitat and a determination of the best treatment methods. This document will be retained by Caddo/Womble Ranger District.

Broadcast herbicide in roadside ditches could indirectly affect these species because it may be sprayed if it occurs alongside an NNIPS such as lespedeza, resulting in the possibility that individuals could be killed. The greatest threat to mesic hardwood species is habitat loss due to the encroachment of woody and non-native invasive herbaceous species into open areas. The herbicide application to invasive vegetative species and the removal of woody species would improve habitat quality by increasing light to the forest floor, decreasing competition. The result is a positive effect for all sensitive plant populations.

Cumulative Effects

Other projects expected to occur in the foreseeable future within the proposed project area include timber harvest, additional prescribed burning, and midstory removal.

Negative cumulative effects are not expected due to the rarity of these species on the landscape, their unlikely occurrence within proposed treatment areas, and their indirect positive response to management activities.

Unique Characteristics of the Geographic Area

The C/W contains the Little Missouri River, a designated segment of Wild and Scenic River. The Ouachita and Caddo Rivers, eligible scenic and recreational river segments for consideration as components of the National System of Wild and Scenic Rivers. Management Area 20 includes ½- mile wide corridors along these rivers. Although these rivers are eligible for consideration, suitability studies are deferred to the State due to very limited National Forest System lands within the river corridors. Management activities such as NNIPS treatment enhance conditions consistent with maintaining the eligibility of the river corridors. Control measures selected would be those that have the least possible impact on the "outstandingly remarkable" features of the corridors. There ae no park lands. There are some occurrences of prime farmlands, generally on terraced sites in proximity to private agricultural lands. Concerning wetlands occurrence, there are no acres mapped as hydric soils on the district. If NNIPS infestations occur within these areas, control measures may be used.

Quality of the Human Environment

The effects of the proposed activities are not known to be controversial in the scientific community.

Uncertainty

There are no effects that are highly uncertain or involve unique or unknown risks. The project is not unique or unusual. The Forest Service has experience implementing similar actions in similar areas. The environmental effects to the human environment are fully analyzed in this EA.

Precedent for Future Actions

This project neither establishes a precedent nor represents a subsequent decision in principle about future actions. This treatment of NNIPS has been occurring at the watershed level for many years. A decision to treat NNIPS at the district level would not limit later resource management decisions.

Cumulative Effects

NNIPS treatments are currently incorporated into vegetation management projects at the watershed level that include many different management activities (i.e. timber harvest, wildlife habitat improvements, trail construction). Approximately 454 acres of foliar spray have been completed over the past two years. **Table 3.7** displays NNIPS control activities planned on the C/W.

Other NNIPS Activities Planned (Table 3.7)

Project	Acres	Decision Year	Treatment Year(s)	Treatment Method
Little Fir Glades	Up to 100	2019	10 to 15	Cultural
Fodderstack Stewardship	Up to 83	2020	10 to 15	Mechanical & Chemical

NNIPS treatment under watershed-level vegetation management projects has averaged 35-50 acres per year in the past; future planned treatment is about 80-183 acres per year (see table above). This equates to a total planned treatment average of 115 to 233 acres per year from the two planned projects. When the proposed action is combined with planned actions, treatment acres would total 300 to 600 per year.

Federal, State, or Local Laws

The proposed actions would not violate any known Federal, State, or local law or requirement imposed for the protection of the environment. They are consistent with the Revised Forest Plan and applicable policies and programs.

Chapter 4
Coordination and Consultation

Coordination

Laura Donaldson	Archeologist
Lisa Cline	Forest NEPA Coordinator
Charles Stokes	District NEPA Planner
Robert Nix	Fire Management Officer
Susan Hooks	Forest Botanist
Dan Batha	Forester
Anthony Lowery	Forester
Kimberly Miller	Silviculturist, District NNIPS Coordinator
Brain Pounds	Biological Technician
Derek Rollins	Biological Technician
Mary Brown	Biologist
David Probasco	Biologist Supervisor
Deanna Younger	District Recreation & Special Uses Program Manager

Consultation

Caddo Nation of Oklahoma

Choctaw Nation of Oklahoma

Osage Nation

Quapaw Tribe of Oklahoma

Chapter 5
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Appendix A

Site-specific Treatment Form

Non-Native Invasive Plant Species (NNIPS) Treatment

Location: (Compartment/Stand, FS Road or Trail Name/No.)

_____

Legal Description: (Township, Range, Section)

_____

Acres: _____

GPSed: **Yes** ☐ **No** ☐

Map Attached: ☐

Target Species:

_____

Method(s) Description: (Manual, mechanical, cultural, chemical)

_____

_____

Method – Chemical **No** ☐ **OR:**

Application method(s): (Foliar spray, basal spray, stem injection, cut-treat)

_____

Herbicide(s):

_____

Application rate(s):

_____

Timing: (May to July, June to September, etc.)

_____

Method – Prescribed Burn **No** ☐ **OR:**

Burn Plan Attached: ☐

Fireline: In Place ☐ **Maintenance _____ miles** **New _____ miles**

Management Area(s):

_____

Control Measures: (Include specific Revised Plan design criteria to protect other resources)

_____

_____

_____

USGS 6th-level subwatershed HUC#: _____

Risk Assessment Level:
Low ☐ **Moderate** ☐ **High** ☐

Ground Disturbance:
Yes ☐ **No** ☐

Estimated Sediment Increase: _____

ACE Output Attached: ☐

Survey Requirements - Heritage Resources:

_____

_____

Clearance Type: (Cultural Resource Report, Project Notification, CE Checklist)

_____

Statement of Effects - Proposed, Endangered, Threatened and Sensitive (PETS) Species:

BE/BA ☐ **OR** **File Letter** ☐ **Document Attached:** ☐

Prepared By:

_____ Date: _____
NEPA Coordinator

Reviewed By:

_____ Date: _____
Archeologist

_____ Date: _____
Biologist

_____ Date: _____
Recreation/Special Uses Program Manager

_____ Date: _____

_____ Date: _____

Approved By:

_____ Date: _____
District Ranger